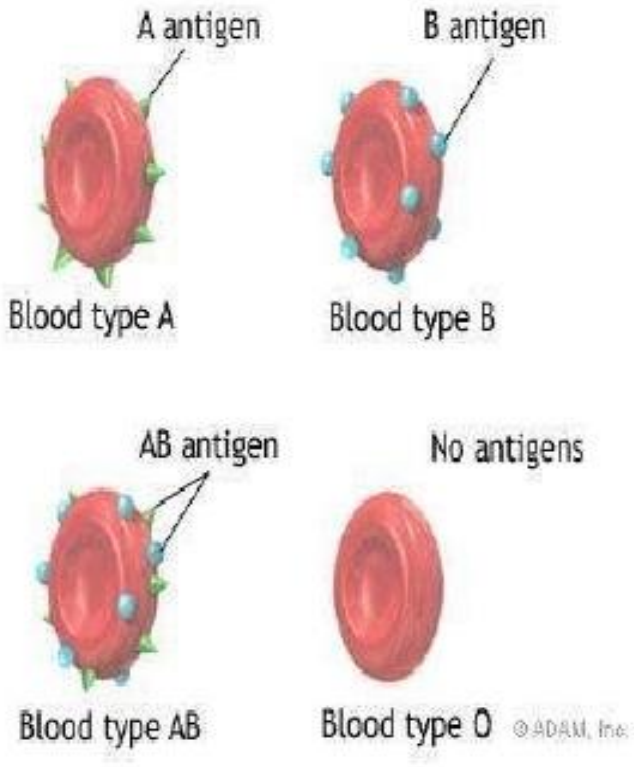
BLOOD GROUPS

ABO System

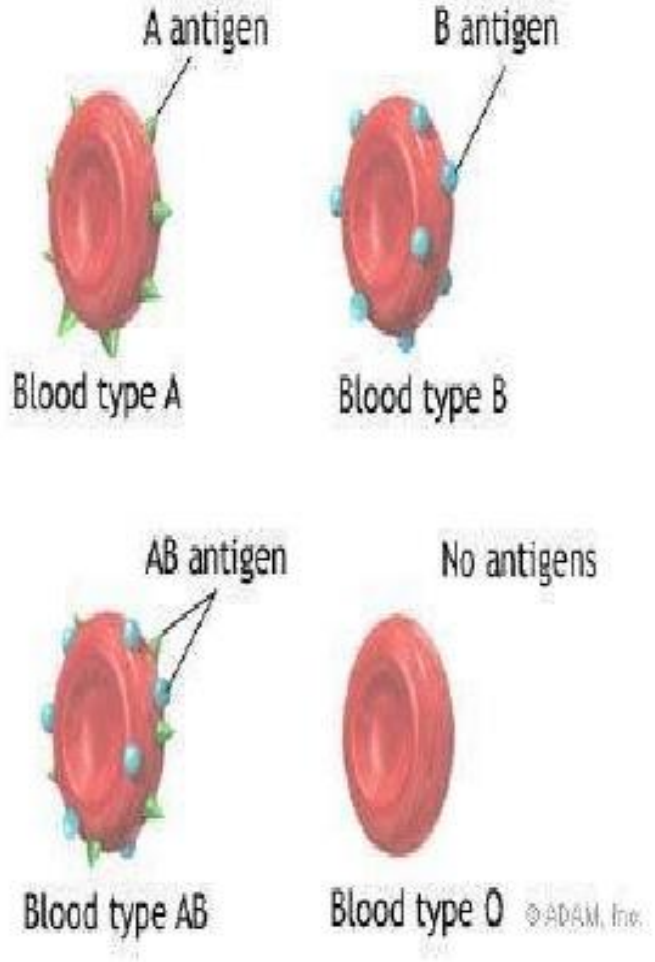
What makes these blood types different?

- The presence of substances called antigens. Antigens are like the cells identification tag. Antigens are located on the cell's membrane.



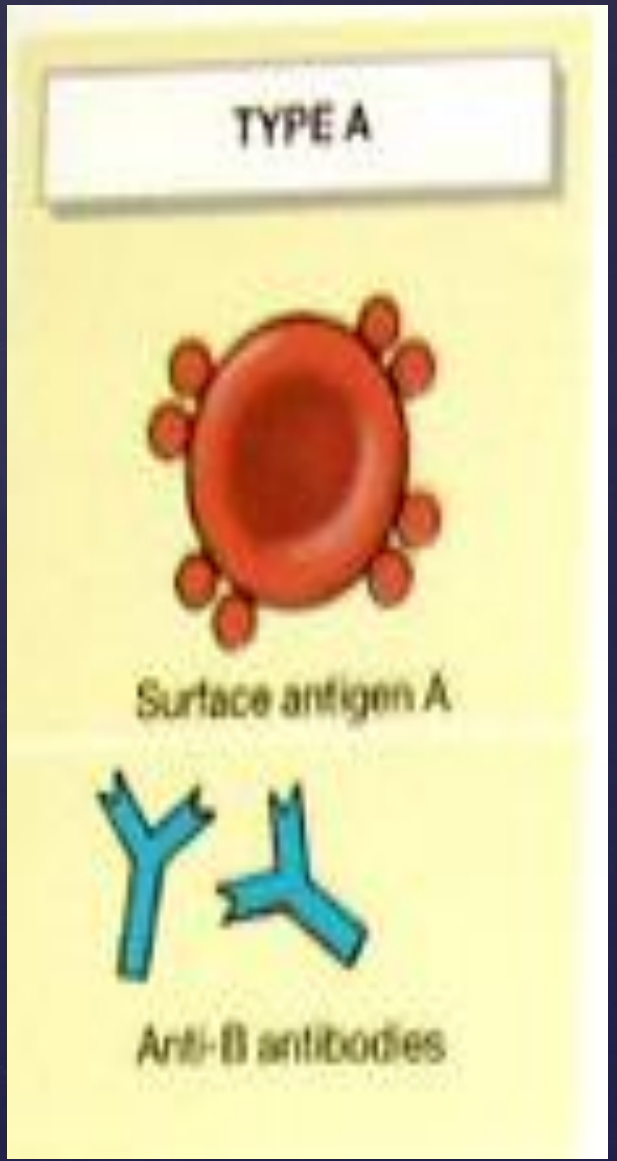
ABO System cont.....

- People with blood type A have A antigens
- People with blood type B have B antigens
- People with blood type AB have A and B antigens
- People with blood type O don't have



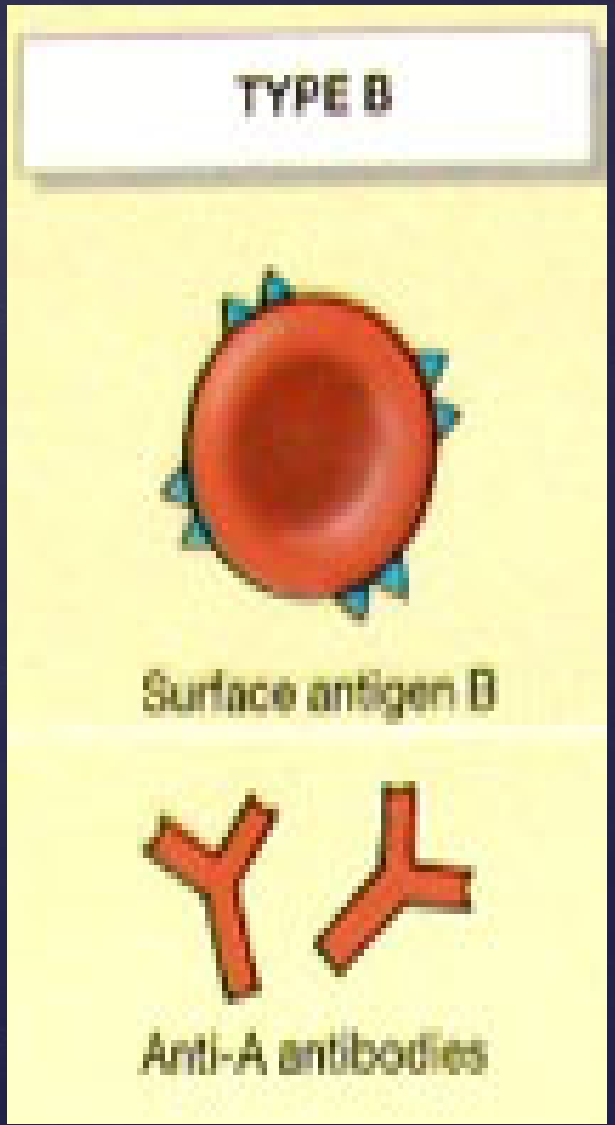
Group "A"

- Approximately 40% of the population is group A.
- Surface Antigen "A" is present but No "B" antigens is present.
- These individuals form potent anti-B antibodies which circulate in the blood plasma at all times.



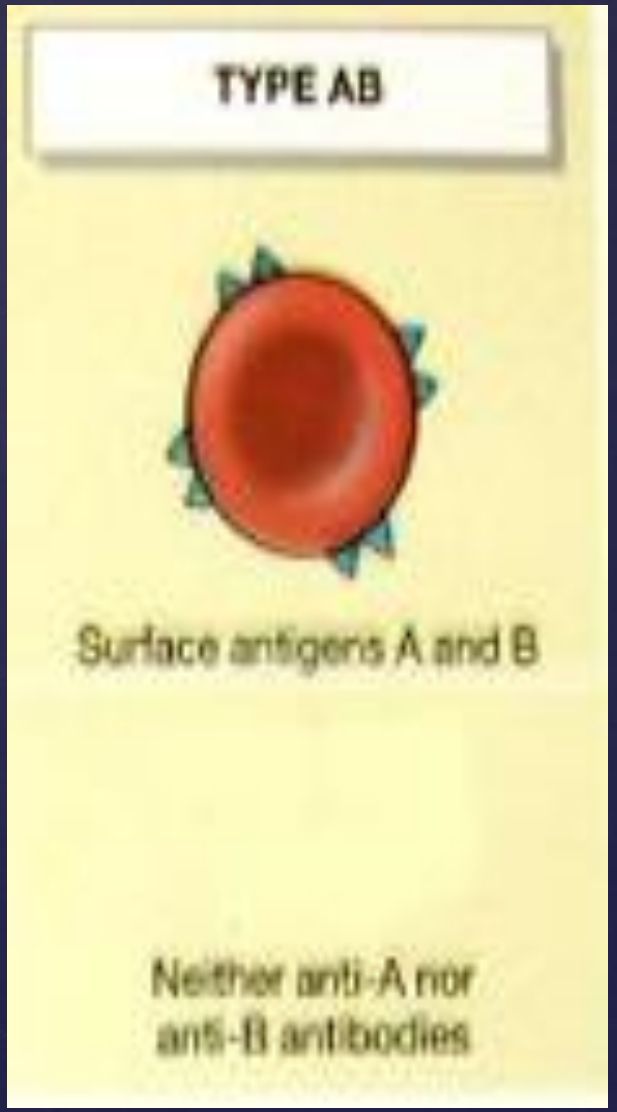
Group "B"

- Approximately 11% of the population is group B.
- Surface Antigen "B" is present but No "A" antigens is present.
- These individuals form potent anti-A antibodies which circulate in the blood plasma at all times.



Group "AB"

- Approximately 4% of the population is group AB.
- Both A and B antigens are present.
- These individuals possess no ABO antibodies.



Group "O"

- Approximately 45% of the population is group O.
- No A or B antigens present, think of as "0" antigens present.
- These individuals form potent anti-A and anti-B antibodies which circulate in the blood plasma at all times.

Rh "D" Antigen

- Of next importance is the Rh type.
  - Term "Rh" is a misnomer.
  - Rh is a blood group system with many antigens, one of which is "D".
- Rh refers to the presence or absence of the D antigen on the red blood cell. The presence of the antibody to the "D" antigen however requires previous exposure to the antigen.

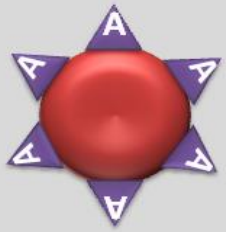
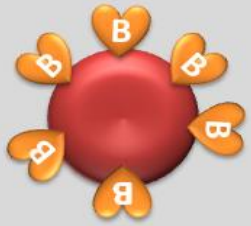
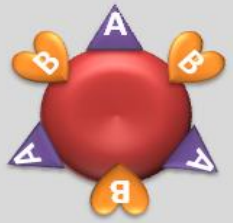
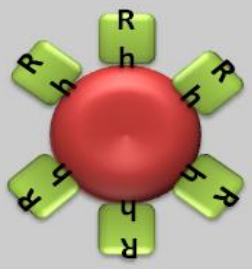
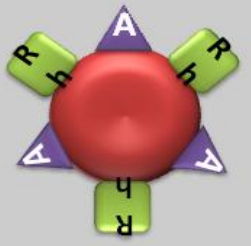
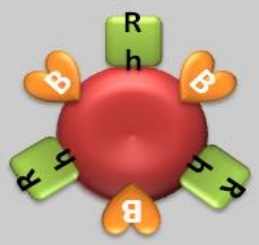
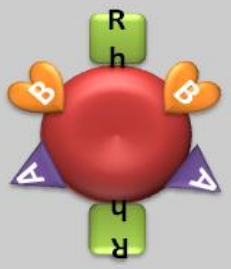
Rh (D) Antigen cont……

- Production of antibody to D requires exposure to the antigen.
- The D antigen is immunogenic, i.e. individuals exposed to it will very likely make an antibody to it.
- For this reason all individuals are typed for D, if negative must receive Rh (D) negative blood.

Rh (D) Antigen cont.….

- The most important patient population to consider is females of child-bearing age.
- If immunized to Rh (D) antigen the antibody can cross the placenta and destroy Rh (D) positive fetal cells resulting in death.
- This is why Rh negative women are given (Rhogam) after birth of Rh positive baby.

Blood Groups Antigens

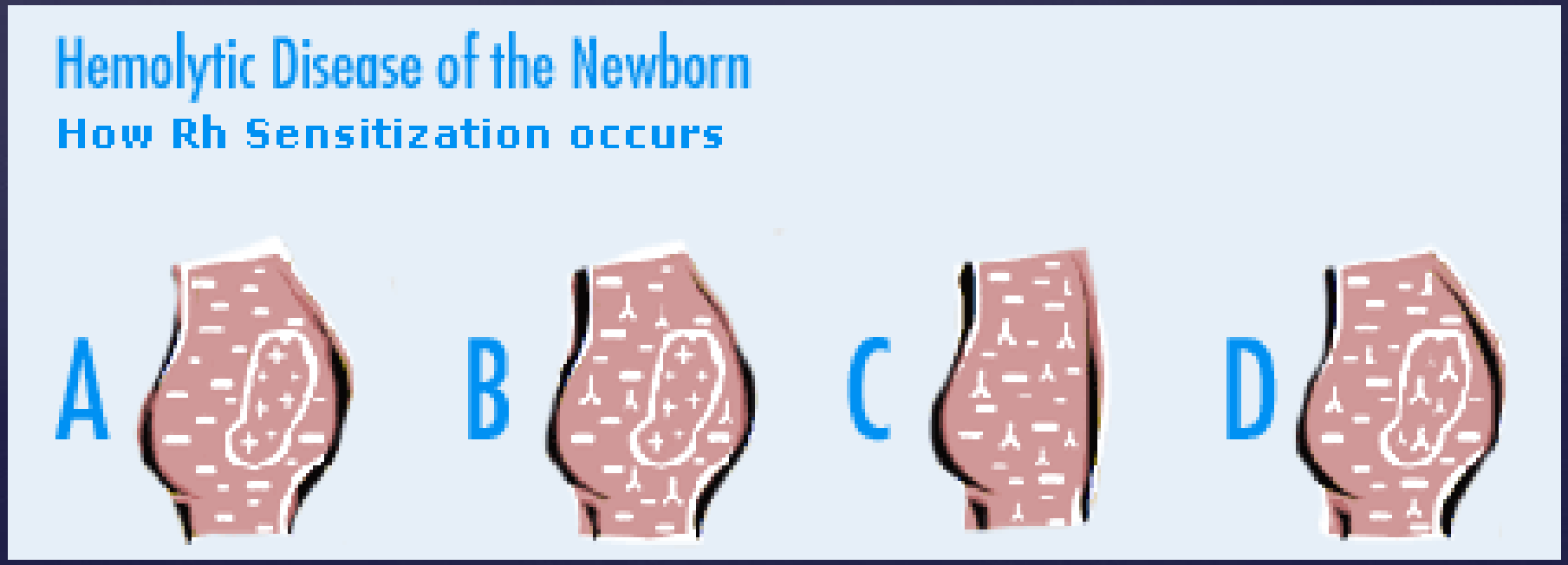
O-	A-	B-	AB-
			
O+	A+	B+	AB+
			

Blood Groups

Blood type	Antigens on blood cells	Anibodies made by the immune system	Can donate blood to	Can receive blood from
O-	None	Anti-A, Anti-B, Anti-Rh	All blood types	O- only
O+	Rh	Anti-A, Anti-B	Any Rh+ blood types	O- or O+
A-	A	Anti-B, Anti-Rh	Any A or AB	O- or A-
A+	A, Rh	Anti-B	A+ or AB+	Any O or A
B-	B	Anti-A, Anti-Rh	Any B or AB	B- or O-
B+	B, Rh	Anti-A	B+ or AB	Any O or B
AB-	A, B	Anti-Rh	Any AB	Any Rh-
AB+	A, B, Rh	None	AB+	All blood types

Hemolytic Disease of the Newborn (Erythroblastosis Fetalis) – How it Occurs

- If a child is Rh positive.
- Then during pregnancy fetal Rh positive RBC's escape into maternal circulation
- Mother produces antibodies to Rh (D) antigen.
- Second or subsequent pregnancies with Rh (D) positive child results in destruction of fetal D positive RBCs.



Interpretation of Slide Typing Testing with Anti-A Anti-Serum

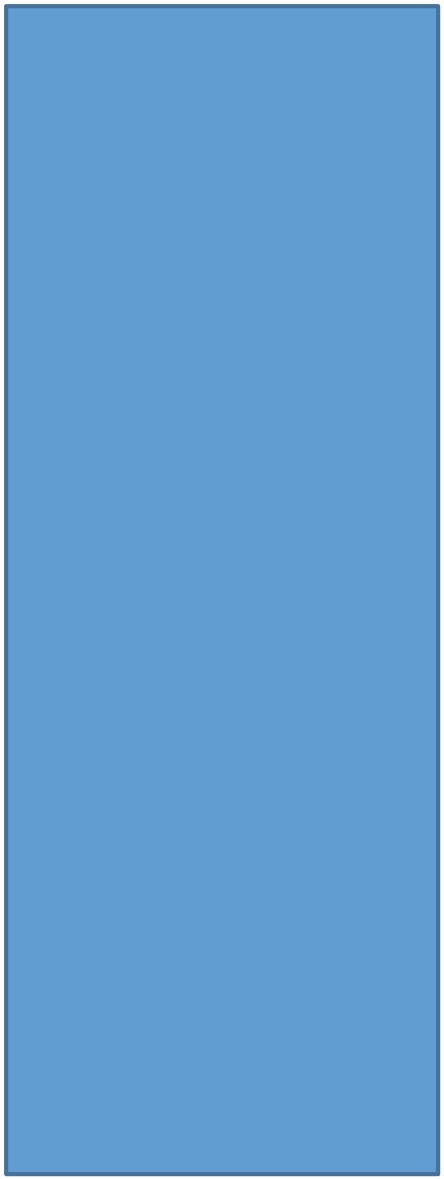
- If an RBC contains the "A" antigen the red blood cells will be agglutinated by anti-A, (a positive reaction).
- If an RBC does not have the A antigen there will be no clumping, (a negative reaction).

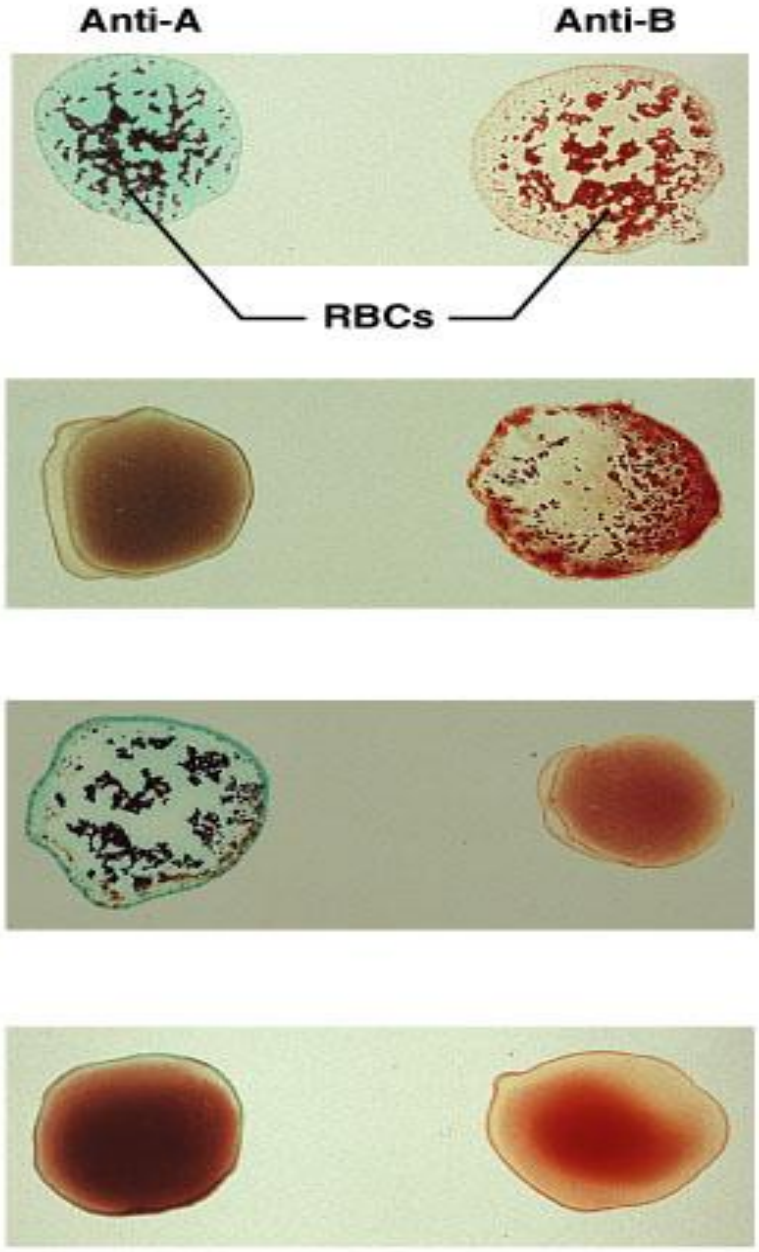
Interpretation of Slide Typing Testing with Anti-B Anti-Serum

- If an RBC contains the "B" antigen the red blood cells will be agglutinated by anti-B, (a positive reaction).
- If an RBC does not have the B antigen there will be no clumping by anti-B, (a negative reaction).

Blood being tested

Serum

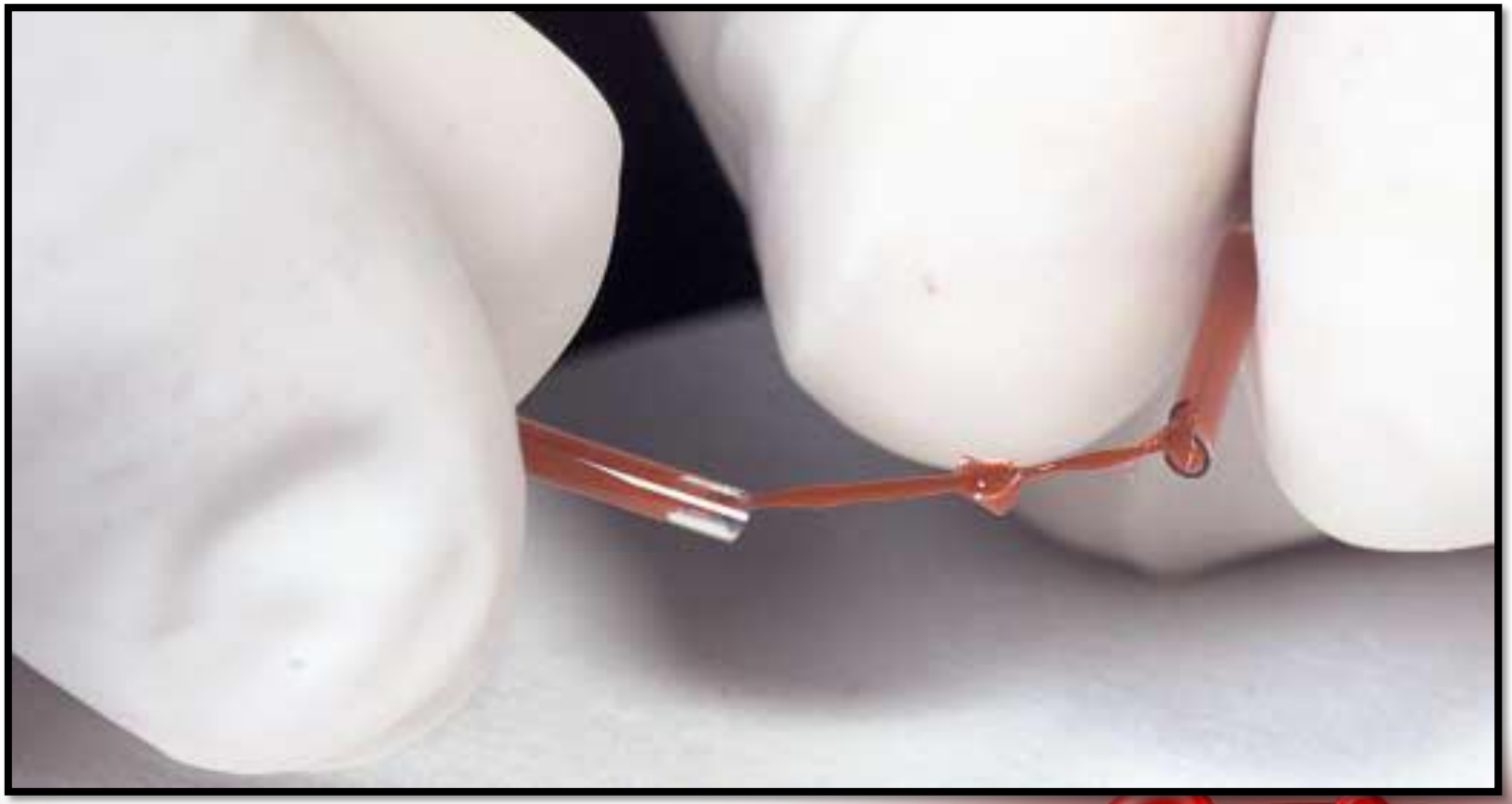




Clotting Time

Clotting Time

- **The time required for blood to form a clot.**
- **The normal coagulation time in glass tubes is 5 to 15 minutes.**
- **The whole blood clotting time is a rough measure of all intrinsic clotting factors in the absence of tissue factors.**
- **This simple test has been used to diagnose hemophilia.**
- **Its chief application is in monitoring anti-coagulant therapy.**



Results

- **Usually the clotting time measured by this method is in the range 5-15 minutes.**
- **Prolong clotting time seen in deficiencies in the intrinsic coagulation pathway.**
- **Example:**

  hemophilia due to deficiency of Factor VIII (8).

Bleeding Time

Bleeding Time

- **Bleeding time is a test of platelet function.**
- **The time it takes for bleeding to stop (time for a platelet plug to form).**
- **The template bleeding time is used when the test is performed by standard template method.**

Bleeding Time

The Standardized Template Method

- A sphygmomanometer cuff is applied to the subject's arm and inflated to 40mmHg.
- The volar surface is cleaned with 70% alcohol.
- A sterile metal template with a linear slit (11mm long) is pressed firmly against the skin.
- A scalpel blade, with a guard, is carefully introduced so that it protrudes 1mm through the template slit. An incision, 1mm deep and 9mm long can then be made.
- Blood is gently, but completely removed with filter paper at 15 second intervals until the bleeding stops.
- Normal bleeding times determined with this method are in the range 2.5-9.5 minutes.

The Standardized Template Method

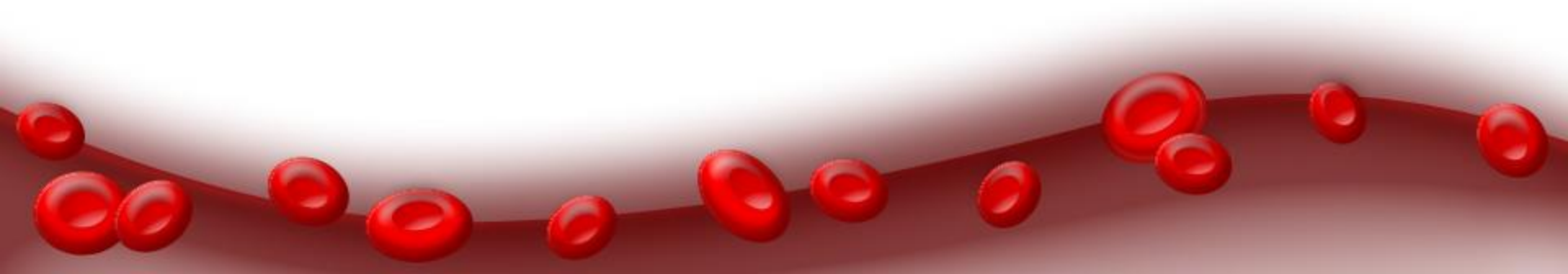
Note

- **If the bleeding time exceeds 15 minutes:**
  - stop the procedure.
  - apply pressure to stop the bleeding.
  - report as greater than 15 min.

Clinical Application

Bleeding time is prolonged in the following conditions:

- **Platelet dysfunction.**
- **Von-Willebrand Disease.**
- **Thrombocytopenia.**



Thank you

You don't have to be a doctor to save lives.

Just donate blood.

Do you know that just a pint of blood can save up to 3 lives?
Donating blood is safe. It's painless, simple, and noble.